REMARKS

Applicants' invention as set forth in claim 1 relates to a method for the preparation of a supported transition metal catalyst comprising the steps of:

(i) mixing together in a suitable solvent

(a) an aluminoxane and

(b) an ionic activator having a cation and an anion, wherein the anion has at least one substituent containing a moiety having an active hydrogen,

(ii) adding the mixture from step (i) to a support material, and

(iii) adding a transition metal compound in a suitable solvent to the support material of (ii).

From this claim it can be seen that the transition metal compound in a suitable solvent is added to the support material after the mixture of an aluminoxane and an ionic activator has been added to the support material. This order of addition is an important feature of applicants' invention.

Another important feature is the specific use of an aluminoxane in the claimed process for making the supported transition metal catalyst system.

Claim 11 relates to a method for polymerizing olefin monomers in the presence of the supported transition metal catalyst prepared by the method of claim 1. It has been amended to be consistent with claim 1 by adding the phrase "to the support material of (ii)" in step (iii).

Claim 12 is similar to claim 11, but limited to a method for (co-)polymerizing ethylene.

In the Office Action, the Examiner continued to reject claims 1-14 under 35 U.S.C. §103(a) for being obvious over Jacobsen '512 and claims 1-15 for being obvious over Jacobsen '165.

Both references disclose methods for forming supported transition metal catalysts and processes for using the catalysts for the polymerization of ethylene.

In both references, however, the support is optional and the order of addition of the specific components is not critical. See Jacobsen '512 at column 17, lines 28-35 and Jacobsen '165 at column 26, line 58 to column 27, line 3. Both also describe a large number of different organometal compounds that may be used including aluminoxanes though alkylaluminum compounds are preferred. See Jacobsen '512 at column 13, line 25 to column 14, line 29 and Jacobsen '165 at column 21, line 56 to column 23, line 33.

In contrast, the method of the present invention requires specific use of an aluminoxane rather than any alternative organometal compound, use of a support, and specific order of addition of the components, wherein the aluminoxane and the ionic activator are mixed together and added to the support prior to the addition of the transition metal compound.

The invention, and in particular the use of aluminoxanes in the claimed process, has been found to result in an advantageous activity profile for the resultant catalysts (see page 2, 6th paragraph of the specification). In the Examples, this is represented by a much lower reaction exotherm than conventionally observed.

In addition, the invention has also been found to give a polymer with higher melt strength. See Example 3, page 12, last line of the specification.

In the Reply filed January 25, 2007, applicants submitted a Declaration of Grant Berent Jacobsen, one of the inventors of this application and the first inventor of Jacobsen '512 and Jacobsen '165. Thus Mr. Jacobsen was thoroughly familiar with the teachings of both of these references and the differences between them and the present invention.

In the Declaration, Mr. Jacobsen noted that the Examiner had referred to a number of Examples of Jacobsen '512 and Jacobsen '165, referred to as D1 and D2, respectively in the Declaration, but none of these Examples exemplified the use of aluminoxane. On the contrary, a number of the Examples, e.g., Example 6 of both Jacobsen '512 and '165, exemplify an equivalent method of the present invention, but use an alkylaluminum (triethylaluminum or TEA) as the organometal compound.

Accordingly, as set forth in Appendix 1 attached to the Declaration, Mr. Jacobsen prepared a catalyst comparable to Example 6 of the two references where TEA was used as the organometal compound. This comparative catalyst was then tested under polymerization conditions similar to Example 3 of the present application.

The reaction profile of this comparative catalyst (A) was then compared to that of Example 3 using the catalyst of Example 2 (B) prepared according to the present invention. The results were shown in Fig. 1 of the Declaration. As noted by Mr. Jacobsen:

> The increase in activity profile shown initially (in Fig. 1) is directly related to the reaction exotherm. It can be seen that the exotherm with the Example according to the present invention (B) is significantly lower than that observed for the equivalent reaction using the comparative

catalyst (A), i.e., using a catalyst comparable to those of D1 and D2 formed using an alkylaluminium instead of an aluminoxane. This would be expected to result in an improvement of the operability of the catalyst at industrial scale.

The Declaration also contained a Fig. 2 showing the marked improvement in melt strengths obtained using the inventive catalyst (B) compared to the comparative catalyst (A).

Accordingly, it was argued that even though the references may generally disclose the use of the components of applicants' catalyst and the order of addition of the components, since there is no specific teaching in the specification or Examples of the references of the use of an aluminoxane with the specifically claimed order of addition of the components and unexpected and superior results were achieved by preparing the catalyst system according to the present invention compared to the preferred method of the references, that applicants' invention should not be considered obvious over either of these references. This was clearly demonstrated by the Figures attached to the Mr. Jacobsen's Declaration.

However, the Examiner believed the Declaration was insufficient to overcome the rejection of the claims because "it does not show that the use of aluminoxane gives unexpected results, nor that the order of producing the catalyst is critical" because the catalyst preparation methods in the Declaration are different from that in the specification. Apparently, the Examiner's concern is that the method for preparing the catalyst of the Comparative Example in the Declaration differed in too many respects from the method used to prepare the catalyst in the application, so that it was not

possible to directly compare the results or that the advantages obtained were necessarily due to the aluminoxane.

In response, enclosed is a further Declaration of Mr. Spitzmesser, that compares in Appendix 2 thereof the results obtained when two catalysts were prepared according to the method of the present invention and used for the copolymerization of ethylene and 1-hexene, where the only difference between them was the use of tetraisobutylaluminoxane on the one hand (invention) and triethylaluminum on the other (comparative). Compare paragraph (ii) of the Appendix which sets forth the preparation of a catalyst according to the invention using an aluminoxane with paragraph (iii) which sets forth the preparation of a catalyst according to the prior art using a trialkylaluminum.

Both catalysts were then used for the copolymerization of ethylene and 1-hexene under identical conditions as set forth on page 2 of Appendix 2 in the paragraph entitled "Experimental" and the reaction profiles of the two are shown in Fig. 1.

As noted by the Declaration and consistent with the results obtained by Mr. Jacobsen in the previous Declaration:

> ". . . the new results in Appendix 2 again show the advantageous activity profile from the catalysts according to the present invention, and in particular, that the initial exotherm from the use of an aluminoxane compared to an alkylaluminium is much lower.

Further, that this would be expected to result in an improvement of the operability of the catalyst at industrial scale.

In the Office Action, the Examiner commented that some of the reasons why she believed the catalyst preparation methods in the Declaration were different from those used in the specification of the application were because "the amounts of the borate,

aluminum compounds and metallocene in the Declaration is [sic are] different from that in the specification and the solvents are different since the specification teaches the use of cyclohexane and the Declaration uses hexane." Page 5, lines 1-4 of the Office Action.

It is noted that the invention and comparative examples in Appendix 2 of the enclosed Declaration also differ in the same respects, albeit slightly. In this regard, Mr. Spitzmesser provides the following comments:

Invention	Comparative	Comment
2.26ml of borate solution.	2.32ml of borate solution	Same within experimental error
0.21ml of a 850mmolAl/L solution in cyclohexane of tetraisobutylaluminoxane	0.75ml of a 250mmolAl/L solution in hexane of triethylaluminium	The different volumes are due to different concentrations of the Al solutions, but result in the same total Al within experimental error. Hexane and cyclohexane are equivalent in this context.
2.47 ml of this solution was slowly impregnated to 3.0g of the TEA treated silica	3.07 ml of this solution	The differences just reflect the different solution volumes obtained from the previous step, this value being the total volume (2.26 + 0.21 = 2.47, 2.32 + 0.75 = 3.07). Both have the same borate and Al (within experimental error).
0.75ml of 1-hexene	0.78ml of 1-hexene	Within experimental error
0.83ml of a Ti solution	0.87ml of Ti solution	Within experimental error

Thus it can be seen that these differences are not significant enough to affect the different results obtained from the two examples.

Accordingly, it is submitted that the inventive and comparative examples of Appendix 2 are a direct comparison between the use of an aluminoxane and a trialkylaluminum in the claimed method for preparing the catalyst used in an ethylene copolymerization process. If the Examiner would like to have these comments in the form of a Declaration of Mr. Spitzmesser, please advise the undersigned.

In view of the unexpected results obtained by Mr. Spitzmesser, it is believed applicants' invention as set forth in claims 1-15 cannot be considered obvious over either of Jacobsen '512 or Jacobsen '165. Their withdrawal as a ground of rejection of the claims under §103(a) is, therefore, requested.

It is believed claims 1-15 are in condition for allowance.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account 06-0916.

Respectfully submitted,

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By: _____

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Attachments: Declaration of Stefan Klaus Spitzmesser